SECTION 14

PART A

GENERAL ELECTRICALS

GENERAL ELECTRICALS

Operation NO	Description	Page No
14 A . 1	Specification	14 A - 3
14 A . 2	General description	14 A - 3
14 A . 3	Servicing the electrical system	14 A - 4
14 A . 4	Preliminary checks	14 A - 4
14 A . 5	Routine maintenance	14 A - 4
14 A . 6	Maintenance free battery	14 A - 5
14 A . 7	Preparation of dry charge batteries	14 A - 6
14 A . 8	Recharging in servicing	14 A - 6
14 A . 9	Boost charging	14 A - 7
14 A . 10	Battery removal and refitment	14 A - 7
14 A . 11	Head light beam adjust	14 A - 8
14 A . 12	Removal and refitment of head light	14 A - 8
14 A . 13	Removal and refitment of Flashing indicator light	14 A - 9
14 A . 14	Removal and refitment of Turn indicator bulb	14 A - 9
14 A . 15	Removal and refitment of work lamp bulb	14 A - 10
14 A . 16	Check - Fuel tank sender unit	14 A - 11
14 A . 17	Removal and refitment of starter switch	14 A - 11
14 A . 18	Removal and refitment of light switch	14 A - 12
14 A . 19	Removal and refitment of turn indicator switch	14 A - 12
14 A . 20	Check air cleaner restriction sensor	14 A - 13
14 A . 21	Removal and refitment of trailor socket	14 A - 13
14 A . 22	Fuses and relays	14 A - 14
14 A . 23	Arrangement of fuse for MF 2615	14 A - 15
14 A . 24	Arrangement of fuse for MF 2605	14 A - 16
14 A . 25	Check relays	14 A - 17
14 A . 26	Instrument cluster	14 A - 18
14 A . 27	Removal and refitment of instrument cluster	14 A - 20
14 A . 28	Instrument cluster - over hauling	14 A - 21
14 A . 29	Wiring diagram for MF 2605 / 2615 (2WD / 4WD)	14 A - 26
14 A . 30	Fault diagonsis	14 A - 36

14 A . 1 SPECIFICATION :

Voltage	...	12 volt negative earth system
Head light high/main beam	...	35 W
Head light low/dip beam	...	35 W
Type	...	RH Traffic , Halogen.
Light , side turn indicator	...	21 W
Work lamp	...	55W , Halogen.
Horn	...	5A.
Hazard warning system	...	Light switch operated.
Light switch type	...	Rotary.
Turn indicator switch type	...	Double pole double throw switch.
Trailer socket	...	As per ASAE S279.13 Std.

14 A . 2 General description:

The electrical system for the 2600 series tractor is a 12 volt negative earth system, charged by an engine mounted alternator. The alternator has an integral rectifier and regulator, with the charging control being machine sensed.

The alternator is mounted on the right-hand side of the engine and is driven by a V-belt from the crankshaft pulley. Adjustment of the V-belt tension is provided for with a slotted link and clamp bolts.

The starter motor is supplied in either standard duty or heavy-duty form and it is mounted on the right-hand side on MF2605 tractor and left-hand side on MF2615 tractor.

A neutral start switch is fitted on the top of the transmission and on the PTO cover . This renders the starter motor inoperative until the dual range selector lever is in the neutral position and the PTO lever in the disengaged position.

Fuses are fitted to protect the lighting, and horn circuits. Wiring diagrams will be found in this section .

The battery access on the three cylinder tractors is located immediately in front of engine radiator.

14 A . 3 Servicing the electrical system:

IMPORTANT : *Always disconnect the alternator wiring before removing the battery leads.*

1. Before any operation is carried out on the tractor electrical system , always disconnect the battery leads.
2. To prevent damage to the voltage regulator do not conect or disconnect any part of the charging circuit including the battery while the engine is running. (This action may damage the voltage regulator).
3. When disconnect the alternator , slave battery or battery charger to the tractor always observe correct polarity ,(Positive to positive , negative to negative) or damage to the voltage regulator and rectifier may occur.

WARNING : If at any time , it is necessary to remove the battery from the tractor , on refitment always ensure that the battery leads are reconnected correctly *THE FIRST TIME* , since even a momentary connection of the wrong lead , with the other lead already in correctly connected , will cause serious damage to the alternator.

Battery Lead Connecting Sequence:

Connect the positive lead (+) to the terminal marked red.

Connect the negative lead (-) to the terminal marked black.

Reverse sequence for battery lead disconnection.

14 A . 4 Preliminary checks:

If the charging circuit is faulty , indicated by a flat battery , frequent topping - up of the electrolyte or the warning light staying on throughout the engine speed range check:

a. That all cable connections are clean and tight .

b. That all components and wiring are without signs of over heating or damage.

c. That the alternator drive belt tension is correct and adjust as necessary.

d. That the battery is serviceable and the connections are in good condition.

For the complete list of electrical system faults, together with their symptoms and remedies , consult fault finding table.

14 A . 5 Routine maintenance

A . Battery:

Check the electrolyte level in the battery after every 500 hrs or 6 months of operation and top up with distilled water as necessary.In an emergency , clean rain water or melted snow can be used in place of distilled water. Never use salt water ,Cholorinated water , chemically soften water, boiled water,or stagnant water .Make sure that the filler plug or cover plate vent holes are kept open and free of dirt at all times. The battery top should be kept clean , any moisture or dirt being wiped off at regular intervals. Dilute ammoina on a lint free cloth should be used for removing any traces of sulphation from the battery top or terminals.The battery posts should be kept clean and the connection checked periodically for tightness. To maintain a dry , clean contact between the battery post and terminal clamp , the terminals should be smeared with grease

B. Alternator:

Routine maintenance is limited to wiping away any oil or dirt which may have accumulated around the openings on the alternator and ensuring that the drive belt is correctly tensioned .The alternator bearings are lubricated on initial assembly and no futher lubrication is needed during service etc.

C. Fuses:

In the case of a blown fuse , the cause must always be identified and rectified before replacement of the fuse. Only fuses of the same capacity may be used for replacement purpose . for the correct fuses , see the list on the fuse list page.

14 A . 6 Preparation of Dry charge batteries

Batteries intended for export markets are supplied dry charged and must be filled with electrolyte of the correct specific gravity according to the climate ,before being put in to service.

Dry charged batteries plates leave the manufacturer in a charged state but slowly discharge while in storage.

Batteries should be filled with electrolyte as near to the commencement of service as is practicable.

It is normally necessary to give an initial charge after filling . The charge should be for a period of 2 hours at a rate equal to 2% of the - 64.4°F (18°C) current as indicated on the performance label.

Initial filling is acheived by removing cell covers and filling each cell with electrolyte of the correct specific gravity to a level of 0.236 inch (6 mm) above the seperators.

After filling is complete the battery must sit 20 minutes prior to charging . If after this 20 minute charging period , the casing of the battery feels warm to the back of the hand , it should be assumed that the battery has become completely discharged during storage and therefore the charging period should be extended to 12 hours at a current equal to 2 % of the - 64.4°F (18°C) cold performance amps.

During the charging the electrolyte temperature should not exceed 95°F (35°C) .

While charging do not touch connections or any part of battery.

At the end of charge switch off first and allow the battery to stand a few minutes for the dangerous gases to disperse.

Electrolyte:

The eletrolyte for a dry charged battery is diluted sulphuric acid . The volume for this battery is approx 9 Lts.

The specific gravity of the electrolyte required when filling is :

a.Climates normally below 77°F (25°C) 1.270 corrected to 77°F (25°C).

b.Climates normally above 77°F (25°C) 1.240 corrected to 77°F (25°C).

The dilution of concentrated sulphuric acid with a specific gravity above 1.400 should only be undertaken by qualified chemical workers.

On Completion of Initial Charge:

On completion of charging , check the specific gravity in the cell to ensure that it is within specified limits for a fully charged battery shown on corrected to 77°F (25°C).

If any cell requires adjustment , some of electrolyte must be siphoned off and replace either by distilled water or electrolyte of the specific gravity used originally in the filling of the battery , depending on wheather the specific gravity is too high or low.

NEVER TRANSFER ELETROLYTE FROM ONE BATTERY OR CELL TO ANOTHER.

If adjustment was necessary continue the charging for an hour to ensure adequate mixing of the electrolyte and again check the specific gravity readings .If necessary repeat the adjustment process untill the correct specific gravity readings are obtained in each cell.

Hydrometer Usage:

The specific gravity of electrolyte is measured using a hydrometer . The readings obtained from each cell should be approximately the same i.e. within the same battery the variation from the highest to the lowest should not exceed 0.020 specific gravity.

The electrolytes specifc gravity varies with tempertaure .All calculation are always corrected to 77°F (25°C). this is known as the reference temperature.

NOTE : *The temperature must be indicated by a thermometer actually immersed in the electrolyte preferably in one of the centre cells.*

All specific gravity readings should be corrected to the reference temperature . This is obtained by deducting 0.007 for every 50°F (10°C). below and adding 0.007 for every 50°F (10°C). above 77°F (25°C).

Safety Notes :

Remove dangerous articles of clothing such as bracelets, necklaces, watches and rings which can cause unwanted short circuits. At all times when handling batteries eye protection must be worn.

Never use an open flame and be particularly careful when using metal tools during the process of examining batteries. Batteries during and immediately, After charge give off a mixture of oxygen and hydrogen. This mixture , if ignited by a spark of flame may lead to an explosion.

14 A . 7 Maintenance free battery:

Maintenance free batteries where fitted as original equipment into Massey- Fergusion tractors require no topping up or checking of electrolyte levels during the life time of the battery.

These batteries are fitted with vented covers and under normal service conditions should not be removed for maintenance.

For capacitance testing operation Where the battery is to be recharged from an external supply or boost is required operation.

Electrolyte Replenishment :

Check the battery electrolyte level every 500 hours or 6 months.

1. Remove the cover plates or plugs.
2. Check that the electrolyte level just covers the battery plates.
3. If the level is incorrect ,top up each cell with distilled water to the correct level.
4. Refit the cover plates or plugs.

NOTE : *Where maintenance free batteries are fitted , no check on electrolyte level is required during the batteries life.*

BATTERY:

Capacitance testing:

Special tools : Crypton battery tester model B51 or equivalent

1. The gases given off by the cells of a battery are explosive. Always use the the battery tester in a well ventilated area.
2. Set the battery tester for:
   a. 12V operation.
   b. a discharge rate , equal to the cold performance amperage.
3. Connect the probe on the tester to the battery positive (+) terminal.
4. Connect the probe on the flexible cable to the battery negative (-) terminal.
5. Test the battery for 15 seconds only , while noting the voltmeter behavior on the upper color scale.
6. A reading in the green zone indicates the battery to be in a satisfactory condition.
7. If the reading is in yellow zone or below , charge the battery and retest.
8. If the meter reading is now in the green zone , the battery is serviceable. A continuous reading in the yellow zone usaully indicates a faulty or worn out battery.
9. If after charge the meter reading falls progressively during the 15 seconds and ends in the red zone , the battery needs to be replaced.

14 A . 8 RECHARGING IN SERVICE:

Hydrometer Test :

The specific gravity of the electrolyte indicates the state of charge in the battery . Using a hydrometer check the specific gravity of the electrolyte in each battery cell and compare the readings with those in the table below.

Electrolyte Temperature Correction :

For every 50^{O}F (10^{o}C). below 77^{O}F (25^{o}C). deduct 0.007 from the specific gravity reading to obtain the true value specific gravity at 77^{O}F (25^{o}C). If the specific gravity of individual cells varies by more than 0.040 the battery should be considered for replacement.

NOTE: Hydrometer readings should not be taken if the battery has just been topped up . Charge the battery for 1-2 hours before testing.

Recharging from an External Application :

If the battery is found to be less than 70% charged, it should be re-charged using an external source . The charging current should be 2% of the cold performance amperage , indicated on battery information decal. Before recharging , make sure that the battery filler plug or cover plate vent holes are open and free of dirt. The battery is fully charged when the specific gravity of the electrolyte and voltage show no increase over three successive hourly readings .During the charge ,the electrolyte level should be checked regularly and replenshied as necessary with distilled water.

14 A . 9 BOOST CHARGING :

Boost charging must be regarded as an emergency measure only, maintenance free batteries must not be boost charged .

Boost charging must be limited to a maximum period of one hour only , with a charge rate of 20% of the cold performance amperage or 30 amps whichever is the smaller.

As the battery state -of- charge rises , the charging rate will fall , but must not be re-adjusted to the original stage.

IMPORTANT : *Always disconnect the alternator wiring before removing the battery leads.*

NOTE : *When reconnecting the battery leads*

Connect the positive lead to the terminal marked (+).(RED).

Connect the negative lead to the terminal marked (-).(BLACK).

Note : *The cover/caps must be fitted at all times , except when checking the electrolyte level. Wipe the battery top and smear the terminals with petroleum jelly.*

Fig 1

SI.NO	State of charge	Specific gravity reading	
		Climate normally below 77°F (25°C).	Climate normally above 77°F (25°C)
1	Fully charged	1.270 - 1.290	1.230 - 1.250
2	70% charged	1.240 - 1.260	1.200 - 1.210
3	Discharged	1.110 - 1.130	1.090 - 1.100

14 A . 10 BATTERY:

Removal and refitment of battery:

Removal:

1. Pull the hood latch cable and lift the hood.
2. Disconnect the battery positive and negative terminals. First in the interest of safety.
3. Remove the wing nuts and washer in both left and right hand side .
4. Lift out the battery hold-down plate with battery hold-down rod
5. Remove the battery from the tractor.

Refitment :

6. Reverse the procedure 1 to 5 except.

   a. Smear the battery terminals and hold-down rod wing nuts with petroleum jelly.

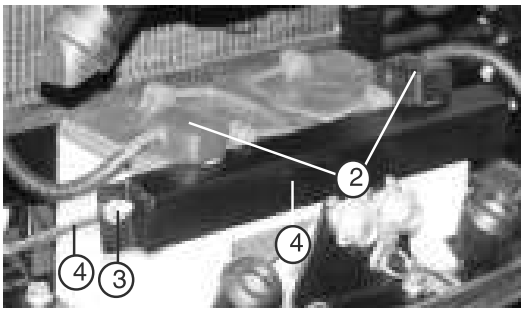


Fig 2

14 A . 11 HEADLIGHT BEAM

Adjust

To adjust the headlights, screw the three screws in or out as required, this will deflect the beam up, down or sideways.

1. Position the tractor facing a wall or screen 7,5 m(25 ft) away, distance (A).
2. Draw a horizontal line on the wall or screen (1) the same as the centre height of the headlights from the ground (B).
3. Draw two vertical lines (2),the same as the horizontal centre to centre distance between the headlights (C), 9.055 inch (230 mm).
4. Draw a second horizontal line (3) at a distance (D) below and parallel to line (1). Distance (D) is calculated by multiplying distance (B) by 0.1; for example,headlight height 44.48 inch (1130 mm) x 0.1 = 4.448 inch (113 mm).
5. Adjust each headlight, on main beam, individually by covering the opposite one and aligning the upper edge of the illuminated zone to line (3).

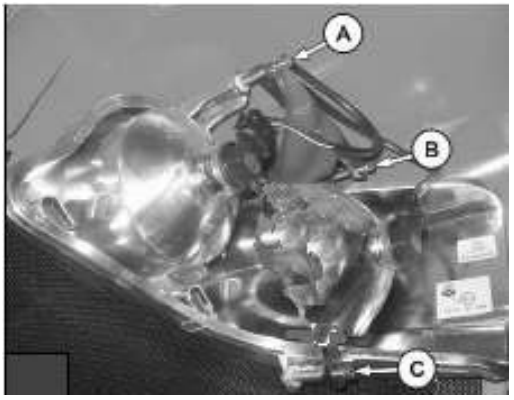


Fig 3

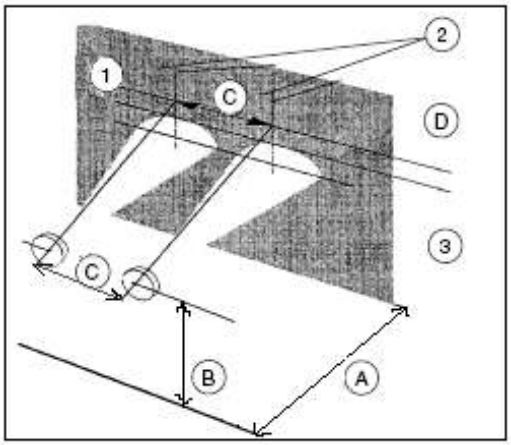


Fig 4

14 A . 12 HEADLIGHT BULB

Removal and refitment

Removal

1. Switch off all light switches.
2. Lift the hood
3. Remove the headlight wiring plug.
4. Turn and Remove the rubber surround (3).
5. Remove the bulb (4).

Refitment

6. Replace the bulb and re-assemble in reverse order.
7. Lower the hood and test.

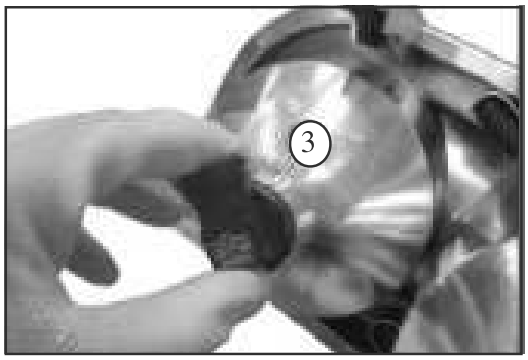


Fig 5

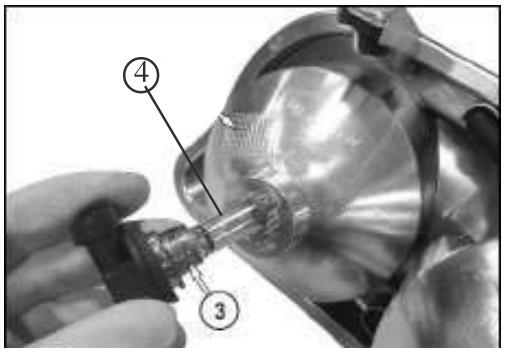


Fig 6

14 A . 13 FLASHING INDICATOR BULB:

Removal and refitment

Removal

1. Remove the two screws attaching the lens.
2. Remove the lens.
3. Remove the failed bulb from its bayonet fitting (3).

Refitment

4. Fit the bulb to the bayonet fitting.
5. Replace the lens and tighten the attaching screws.
6. Test the lights.

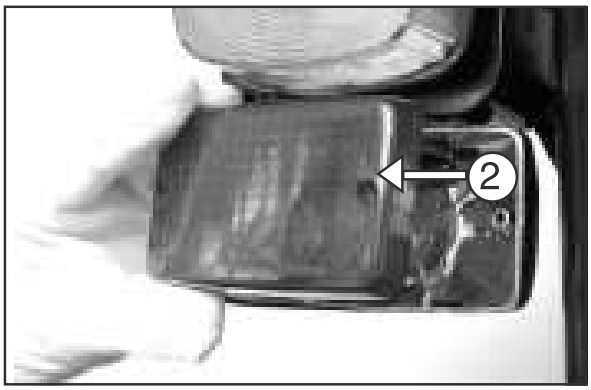


Fig 7

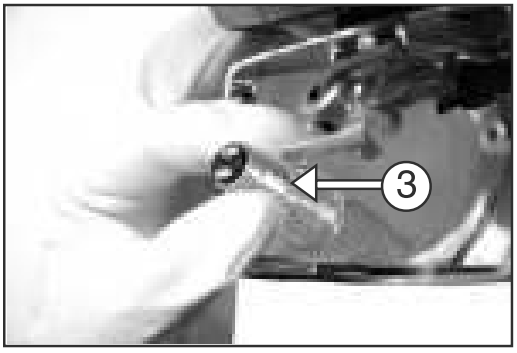


Fig 8

14 A . 14 TURN INDICATOR BULB

Removal and refitment

Removal

1. Remove the two screws attaching the lens.
2. Remove the lens.
3. Remove the failed bulb from its bayonet fitting.

Refitment

4. Fit the bulb to the bayonet fitting.
5. Replace the lens and tighten the attaching screws.
6. Test the lights.

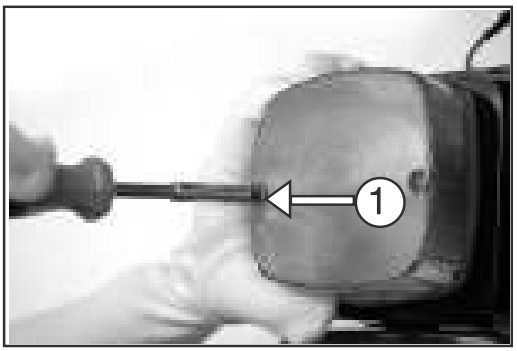


Fig 9

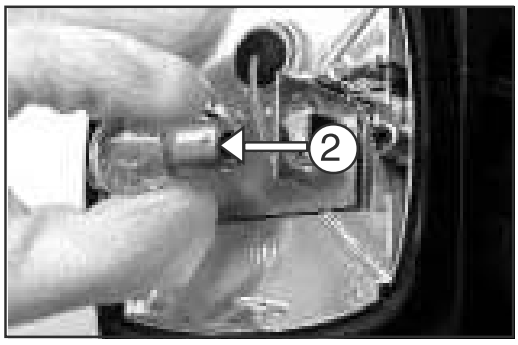


Fig 10

14 A . 15 WORK LIGHT BULB

Removal and refitment

Removal

1. Remove the retaining screws.

Fig 11

2. Ease the light unit out of the body.

Fig 12

3. Remove the spring clip from the back of the bulb.

Fig 13

4. Remove the bulb .

Fig 14

Refitment

5. Reverse the procedure 1 to 4 except .
   a. Replace the failed bulb with a new one.

14 A . 16 FUEL TANK SENDER UNIT:

Check

Test Equipment: MF.3005 Digital Multimeter

Procedure

1. Disconnect the plug to the fuel tank sender unit.
2. Connect the MF.3005 Digital Multimeter between terminals 1 and 2. Terminal 3 is the connection for the 'Low fuel' warning light.
3. Check the contents of the fuel tank.
4. The approximate resistance reading should be as follows:

Tank contents	Meter reading
Full	6 - 8 ohms
Three quarter full	58 - 62 ohms
Half full	115 - 119 ohms
Quarter full	172 - 178 ohms
Low fuel light ON	234 - 240 ohms
Empty	322 - 332 ohms

5. This test will give an indication if there is a fault with the sender unit.

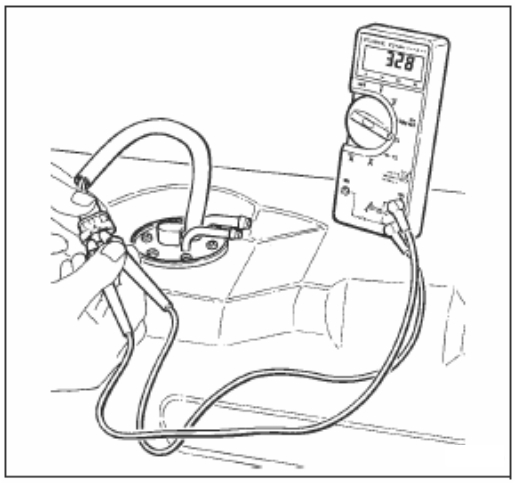


Fig 15

14 A . 17 STARTER SWITCH

Removal and refitment

Removal

1. Remove the instrument cowl.
2. Lift the hood and disconnect the battery removing the negative cable (-) first in the interest of safety.
3. Remove the rubber cover from the switch
4. Label and disconnect the wires from the rear of the switch.
5. Remove the slotted nut surrounding the key hole in the starter switch.
6. Withdraw the switch from behind the instrument panel.

Refitment

7. Reverse procedures 1 to 6.

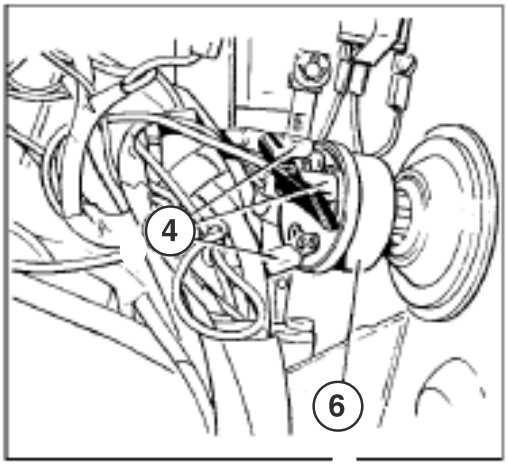


Fig 16

14 A . 18 LIGHT SWITCH

Removal and refitment

Removal

1. Remove the instrument cowl.
2. Lift the hood and disconnect the battery, removing the negative cable (-) first in the interest of safety.
3. Press the plunger with suitable pin and release the knob from switch.
4. Remove the spring (if fitted).
5. Label and disconnect the two connectors from the switch terminals.
6. Remove the locknut.
7. Withdraw the switch from behind the instrument panel.

Refitment

8. Reverse procedures 1 to 7.

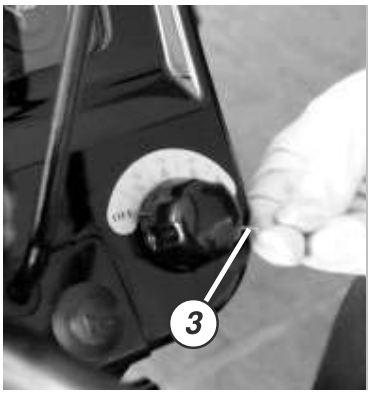


Fig 17

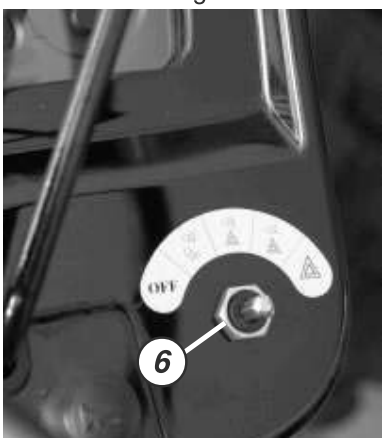


Fig 18

14 A .19 TURN INDICATOR SWITCH:

Removal and refitment

Removal

1. Remove the lower instrument panel.
2. Pull the indicator switch arm off the indicator switch, away from the instrument panel by pressing the plunger with suitable pin.
3. Remove the lock nut.
4. Remove the harness connector from the rear of the switch.
5. Remove the switch from its mounted position.

Refitment

6. Reverse procedures 1 to 5.

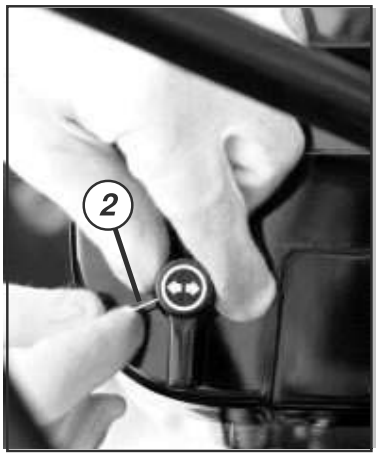


Fig 19

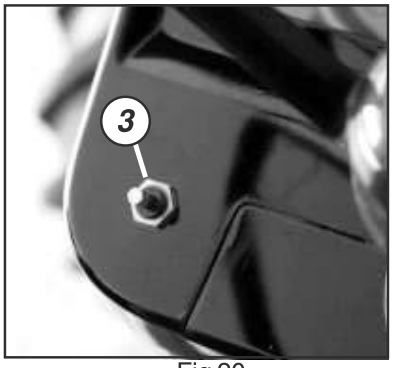


Fig 20

14 A . 20 Air cleaner restriction sensor

If the restriction sensor fails to operate (warning light does not light up, even with a clogged air cleaner), first of all, ensure that the problem is not the warning light bulb, or in any disconnected wire. For this operation, turn the ignition key to the 2nd position with engine not running. If the warning light, lights up, the problem lies in the sensor itself.

Carry out the test by adhering to the following practices:

a) Pull the hood latch cable and lift the hood to access vaccum switch.

b) Run the engine and keep it at 1000/1200 rpm.

c) Cover the air cleaner inlet (5A) with a metal plate or a piece of flat wood for a brief period, then check if the warning light (5C) on the instrument panel: it should light up. If it does not, replace the sensor (5B).

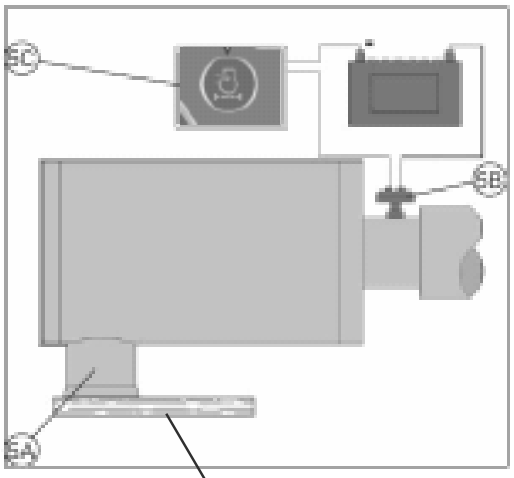


Fig 21

14 A . 21 TRAILER SOCKET

Removal and refitment

Removal

1. Disconnect the battery, removing the negative cable (-) first in the interest of safety.
2. Remove the two screws, nuts and washers.
3. Pull the socket and connecting wire away from the mounting bracket, allowing the connecting wire retaining screws to be slackened, so releasing the connecting wire. Do not over strain the wire loom.
4. Check for wear, damage or corrosion and replace the socket with a new one if necessary.

Refitment

5. Reverse procedures 1 to 4.

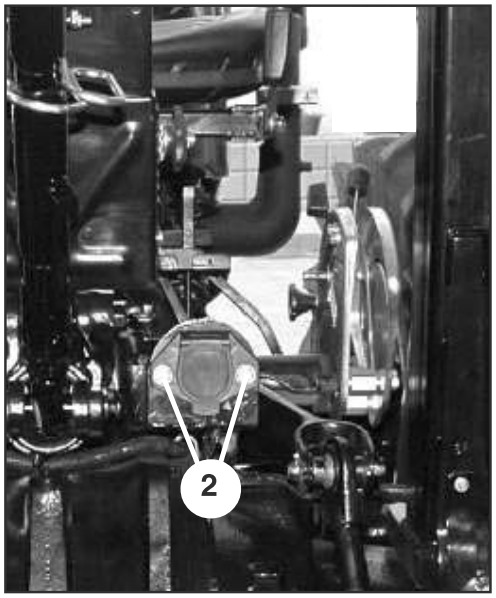


Fig 21

14 A . 22 FUSES AND RELAYS

Check

Fuses and relays are situated in five places as follows:

- Console fuse panel under the steering wheel.
- Behind the instrument panel - relays only.

The fuses installed in the fuse boxes and relays will depend upon the model specification.

Fuses :

1 The fuses are located in behind the fuel filter.

2 The cover (A) holds the spare fuse in different different fuse ratings.

3 primary fuse (B) for over all protection of the electrical system.

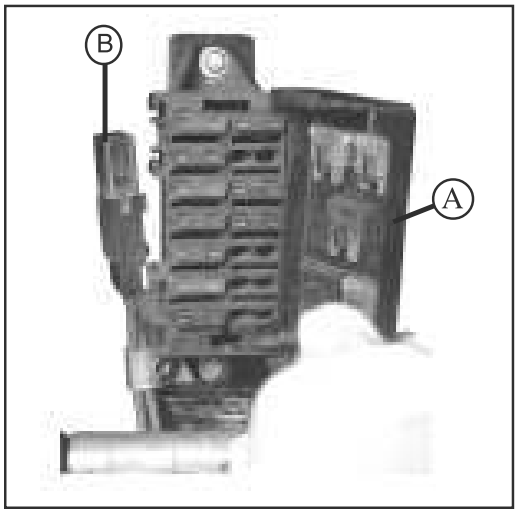


Fig 22

Fuses:

Removal and refitment

Removal:

1. Pull the hood latch cable and lift the hood.
2. Disconnect the battery terminal for your interest of safety.
3. Press and pull to remove the fuse box cover to access the fuses.
4. Remove the failured fuse.

Replacement:

5. Reverse the procedure 1 to 4 .except
   a.replace the failured fuse by new one.

Fuse ratings and color identification

The fuses are specified in different ratings and color for different application and easy identification.The fuse color and ratings are specified as follows.

Ratings (amps)	Identification colors
5	Tan
10	Red
15	Blue
25	Natural white

14 A . 23 Arrangement of fuse in fuse box for MF2615 (2WD/4WD)

1. FOR TRACTOR WITH

LIVE PTO

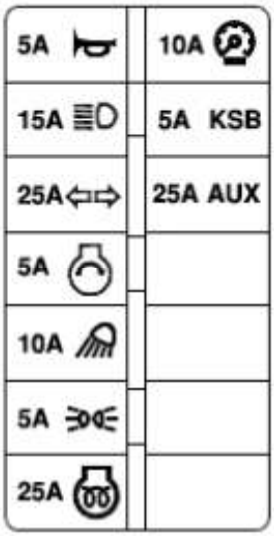


Fig 23

2. FOR TRACTOR WITH

IPTO

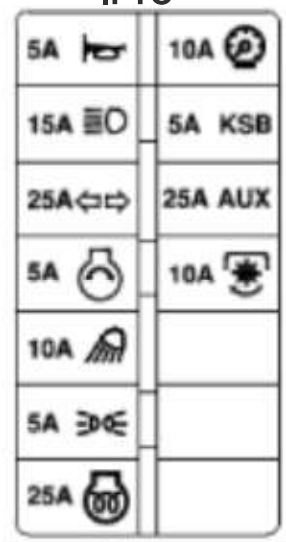


Fig 24

KEY TO SYMBOLS

	→	Horn
	→	Head lamps
	→	Flashing light
	→	Start
	→	Work lamp
	→	Tail lamp
	→	Heater
	→	Instrument cluster
KSB	→	KSB circuit
AUX	→	Auxiliary power
	→	I - PTO

14 A . 24 Arrangement of fuse in fuse box for MF 2605 (2WD/4WD):

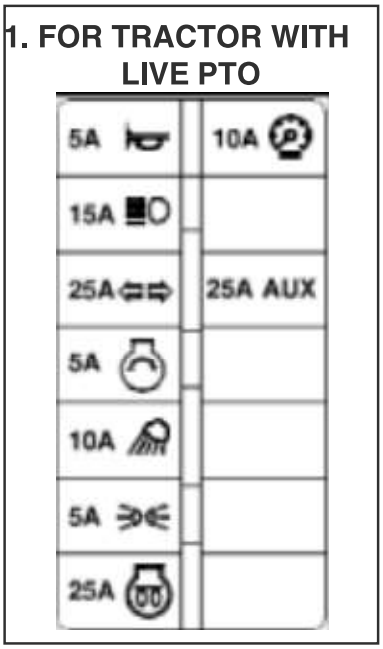


Fig 25

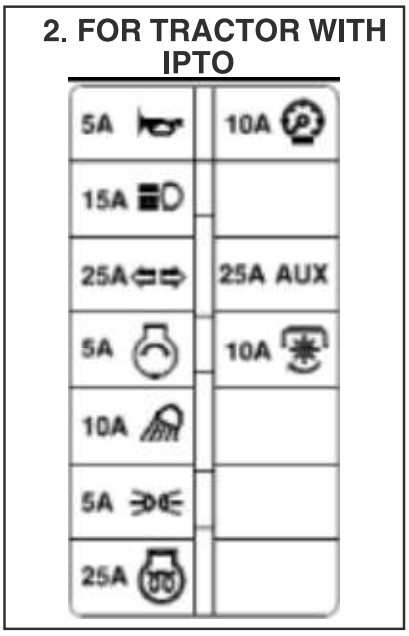


Fig 26

KEY TO SYMBOLS

	→	Horn
	→	Head lamps
	→	Flashing light
	→	Start
	→	Work lamp
	→	Tail lamp
	→	Heater
	→	Instrument cluster
KSB	→	KSB circuit
AUX	→	Auxiliary power
	→	I - PTO

14 A . 25 RELAYS

Removal and Refitment

Test Equipment: MF.3005 Digital Multimeter

Electrical relays are provided in the following services:

1) Head lamp main beam.
2) Head lamp low beam.
3) Amber flashing light (Hazard).
4) Red flashing lights (Turn).
5) KSB solenoid - For MF2615 Only.

The illustration shows the relay used on the tractor, the pin layout, terminal numbers, electrical schematic, switch and coil connections.

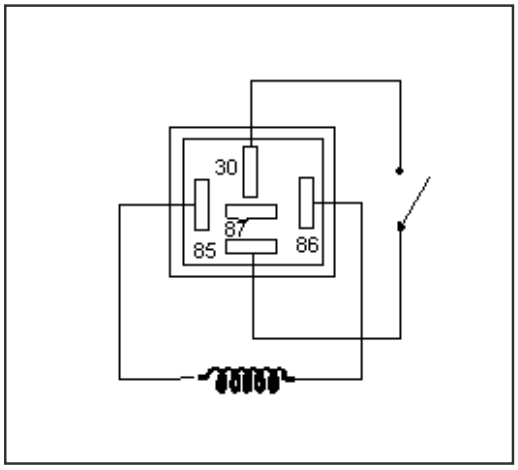


Fig 27

Removal

1. Access and remove the suspect relay.
2. Test the coil between terminals 85 and 86 with the MF.3005 Digital Multimeter set on ohms.
3. The reading should be approximately 65 ohms.
4. Terminals 30 and 87 is the switch which is normally open, closed when the coil is energised.

Fig 28

14 A . 26 Instrument cluster

The instrument panel has a number of displays and warning lights as follows:

5. Engine RPM meter - Showing engine speed.
14. Hour meter - Showing No.of houre run by tractor (Real hour - irrespective of engine speed)
10. Fuel guage - Shows the fuel level in the tank.
9. Temperture guage - Shows the temperature of the coolant in the engine.
1. Engine oil pressure guage - Shows the pressure developed in engine oil pump.
18. Voltmeter - Shows the battery voltage.

Instrument warning light - Shows warning indication in the cluster or indication of engaged services.The lights are as follow

From left hand side.

2. Left hand turn signal indicator light.
3. Turn signal indicator light 1st trailor.
4. Head light high beam light.
15. Low engine oil pressure indicator light.
16. Battery charge indicator light.
17. 4WD drive indicator light.(If provided).

From right hand side:

6. IPTO indicator light.(If provided).
7. Air filter restriction indicator light.
8. Right hand turn signal indicator light.
9. Engine coolant high temperature warning light.
11. Not used.
12. Not used.

Various sender units are used to control the instruments as follows:

Oil pressure switch - Engine oil pressure

Vacuum switch - Air filter restiction.

Fuel sensor - Fuel level in the tank.

Temperature sensor resistor - engine coolant.

The wiring to all electrical services is an earth / ground return system, the earth wire (-) is colour coded black and is connected to the chassis at various point around the tractor.

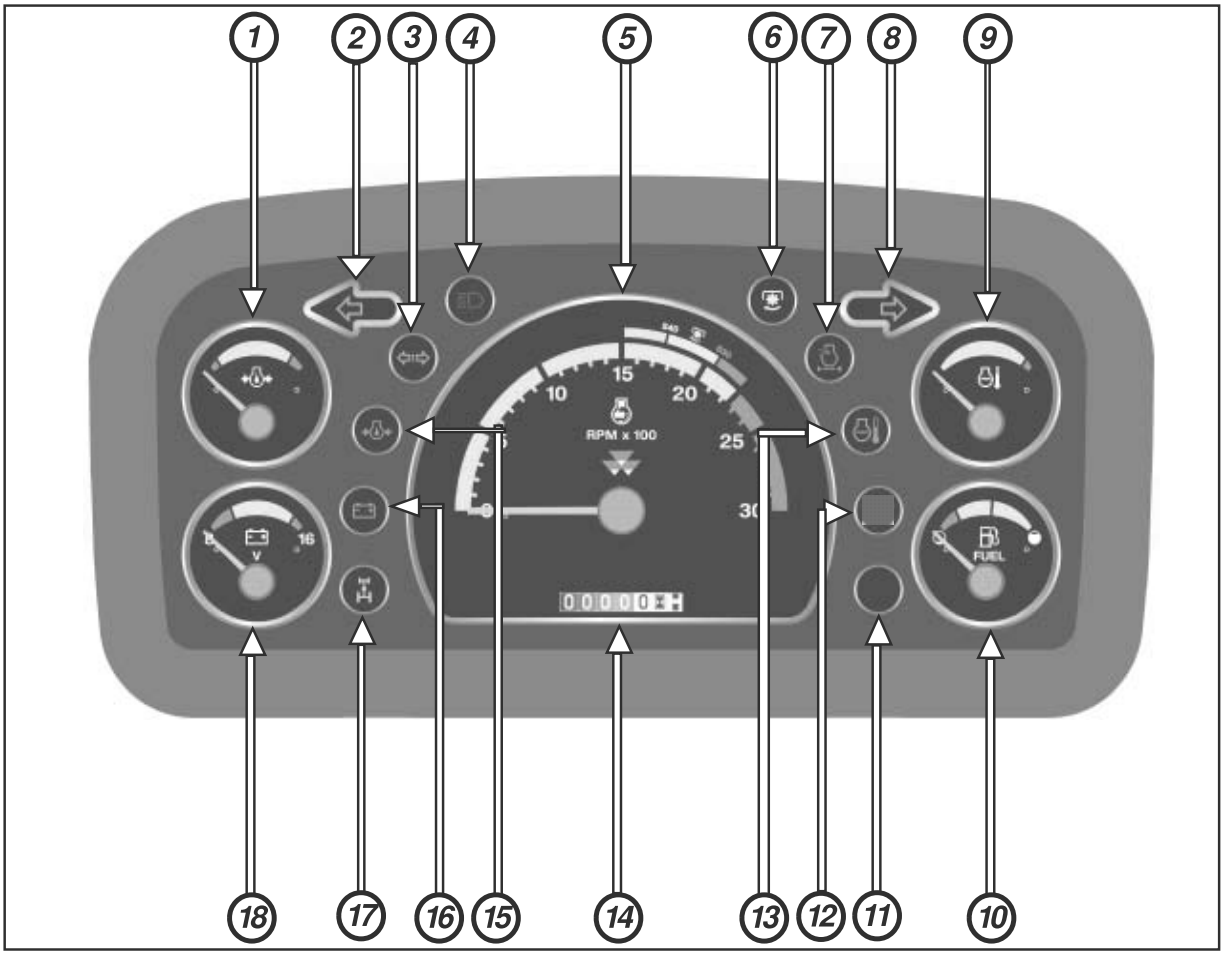


Fig 29

1. Engine oil pressure gauge
2 . Left-hand turn signal indicator light
3. Turn signal indicator light 1st trailer
4. Head light high beam light
5. Engine RPM meter
6. IPTO indicator light (If provided)
7. Air filter restriction indicator light
8. Right-hand turn signal indicator light
9. Engine coolant temperature gauge
10. Fuel gauge
11. Not used
12. Not used
13. Engine coolant high temperature warning light
14. Hour meter
15. Low engine oil pressure indicator light
16. Battery charge indicator light
17. 4WD indicator light (If provided)
18. Voltmeter

14 A . 27 Instrument cluster

Removal and Refitment:

Removal

1. Pull the hood latch cable and lift the hood.
2. Disconnect the battery terminals.
3. Remove the bottom surround mounting screws.
4. Remove the top surround mounting screws.
5. Disconnect the wiring harness from the cluster.
6. Place the cluster with surround in scratch free area and remove the six mounting screws.

Refitment:

7. Reverse the procedure 1 to 6.except
   a.Ensure that the wiring harness connectors and connector cover are correctly fitted in the back of the instrument cluster.

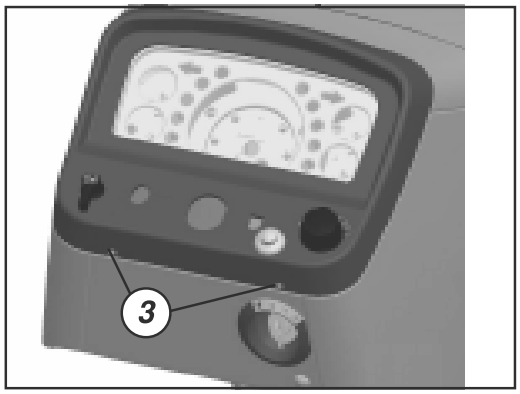


Fig 30

Fig 31

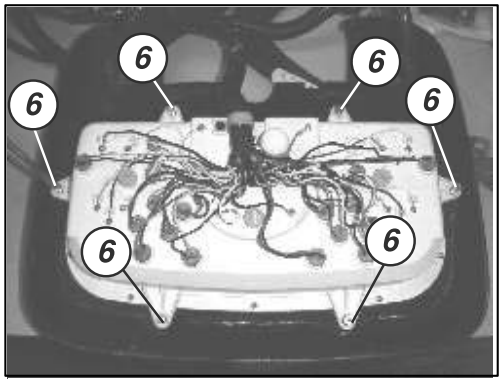


Fig 32

14 A . 28 INSTRUMENT CLUSTER

Overhaul

Precautions to be taken care while replacing :

Procedure for replacing:

Keep the instruments cluster in facing down on a *"clean"*and *"scratch free"* surface.

1. Remove the cluster from the tractor.

   a. Carefully remove the (10) self-tapping screws that are used to fix the front cover to the rear case.

   b. Reverse the instrument cluster and take away the front cover,glass with sealing ring assembly and front dial and keep it on the scartch free surface in the dust free area / enviroment .

Instrument cluster consists of the following.

1.Electronic hour RPM meter.

2.Fuel gauge

3.Temperature gauge

4.Pressure gauge

5.Voltmeter

6.Symbol sheets (2- nos)

c.Electronic hour RPM meter consists of

- Assy PCB rigid.
- Assy RPM system with hour meter.

Fig 33

Fig 34

Fig 35

Electronic hour counter RPM meter

Removal of Assy RPM with hour meter:

1. Remove the cluster from tractor and keep the cluster facing down on scartch free surface.
2. Remove the six screws,spring washer and plain washer.
3. Remove the slot nut and washer.
4. Remove the rpm meter from the cluster.

Refitment :

5. Reverse the procedure 1 to 3 except
   a. Tighten the all screws at the torque of 1.5 kgf - cm (1.2 lbf.inch) minimum can be applied.
   b. Ensure proper seating of screws.

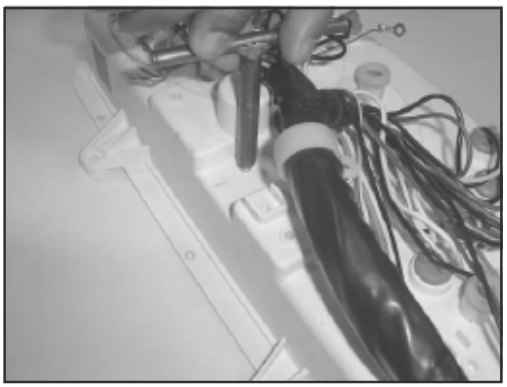


Fig 36

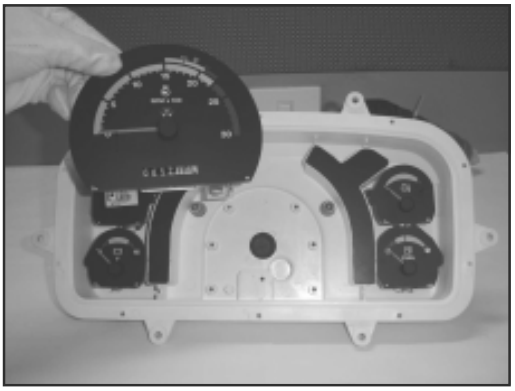


Fig 37

Assy PCB rigid:

Removal:

1. Remove the cluster from tractor and keep the cluster facing down on scartch free surface.
2. Remove the four screws ,from the RPM meter.
3. Remove the assy PCB rigid from the assy RPM meter.

Refitment :

4. Reverse the procedure 1 to 3 except
   a. Tighten the four screws at the torque of 3.5 kgf - cm - 7 kgf/cm (3 - 6 lbf.inch) minimum can be applied.
   b. Ensure proper seating of screws and gauges.

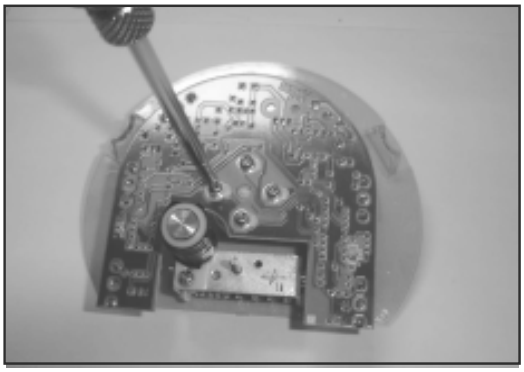


Fig 38

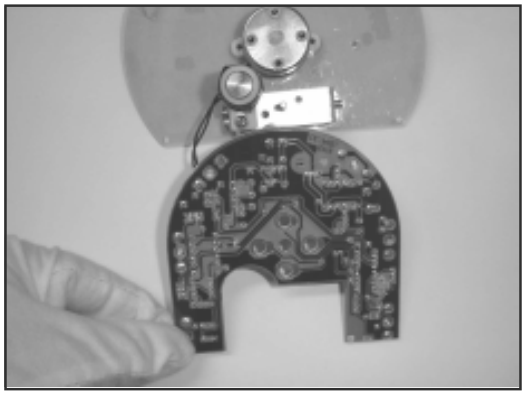


Fig 39

Fuel Gauge:

Removal :

1. Remove the cluster from tractor and keep the cluster facing down on scartch free surface.
2. Remove the three screws , spring washer from the fuel gauge system.
3. Remove the fuel gauge from the instrument cluster.

Refitment :

4. Reverse the procedure 1 and 3 except
   a. Tighten the three screws at the torque of 1.5 kgf/cm (1.2 lbf.inch) minimum can be applied.
   b. Ensure proper seating of screws and gauges.

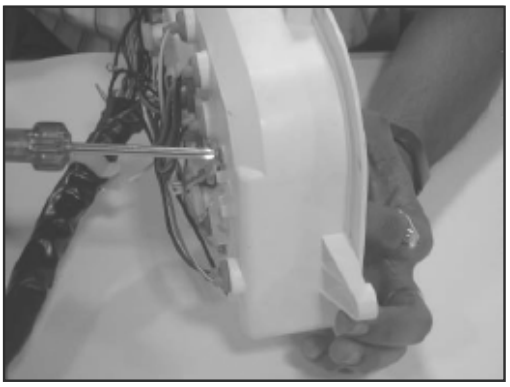


Fig 40

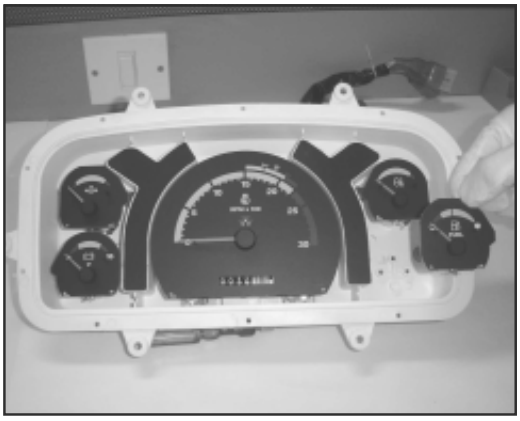


Fig 41

Temperature Gauge:

Removal:

1. Remove the cluster from tractor and keep the cluster facing down on scartch free surface.
2. Remove the three screws , spring washer from the temperature gauge system.
3. Remove the temperature gauge from the instument cluster.

Refitment :

4. Reverse the procedure 1 and 3 except
   a. Tighten the three screws at the torque of 1.5 kgf/cm (1.2 lbf.inch)minimum can be applied.
   b. Ensure proper seating of screws and gauges.

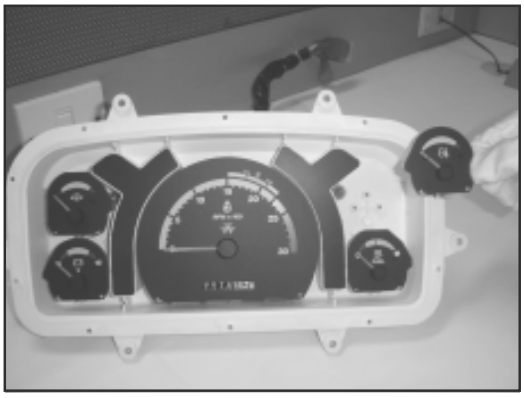


Fig 42

Pressure Gauge:

Removal:

1. Remove the cluster from tractor and keep the cluster facing down on scartch free surface.
2. Remove the three screws , spring washer from the oil pressure guage.
3. Remove the oil pressure gauge from the instrument cluster.

Refitment

4. Reverse the procedure 1 and 3 except
   a. Tighten the three screws at the torque of 1.5 kgf- cm (1.2 lbf.inch) minimum can be ap plied.
   b. Ensure proper seating of screws and gauges.

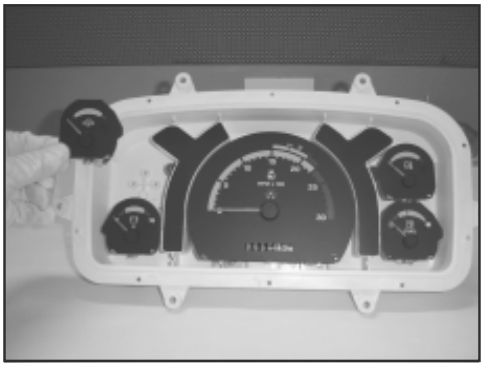


Fig 43

Voltmeter

Removal:

1. Remove the cluster from tractor and keep the cluster facing down on scartch free surface.
2. Remove the two screws , spring washer from the instrument cluster.
3. Remove the voltmeter from the instrument cluster.

Refitment :

4. Reverse the procedure 1 and 3 except
   a. Tighten the six screws at the torque of 1.5 kgf - cm (1.2 lbf.inch.)minimum can be applied.
   b. Ensure proper seating of screws and gauges.

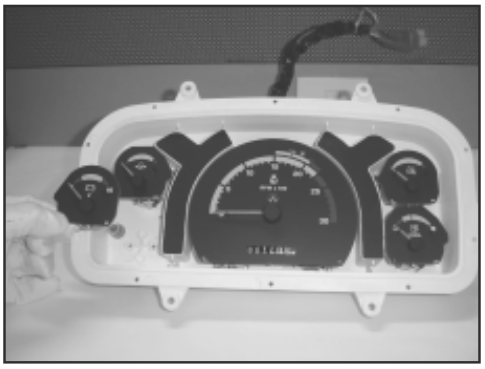


Fig 44

Instrument Cluster Blub

Removal and refitment

Removal

1. Pull the bulb and its holder from the instrument cluster and remove the bulb from the holder.

Refitment

2. Fit the bulb in its holder.
3. Push the bulb holder and bulb into the instrument.

Fig 45

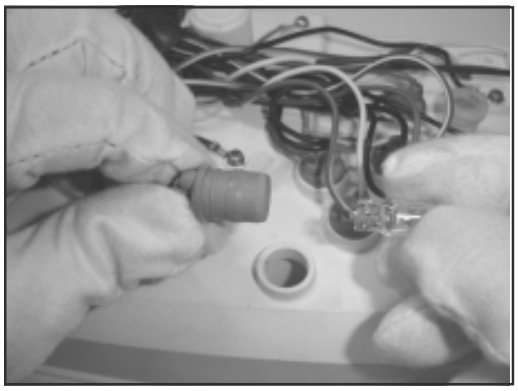


Fig 46

Assy.Wiring harness:

Removal

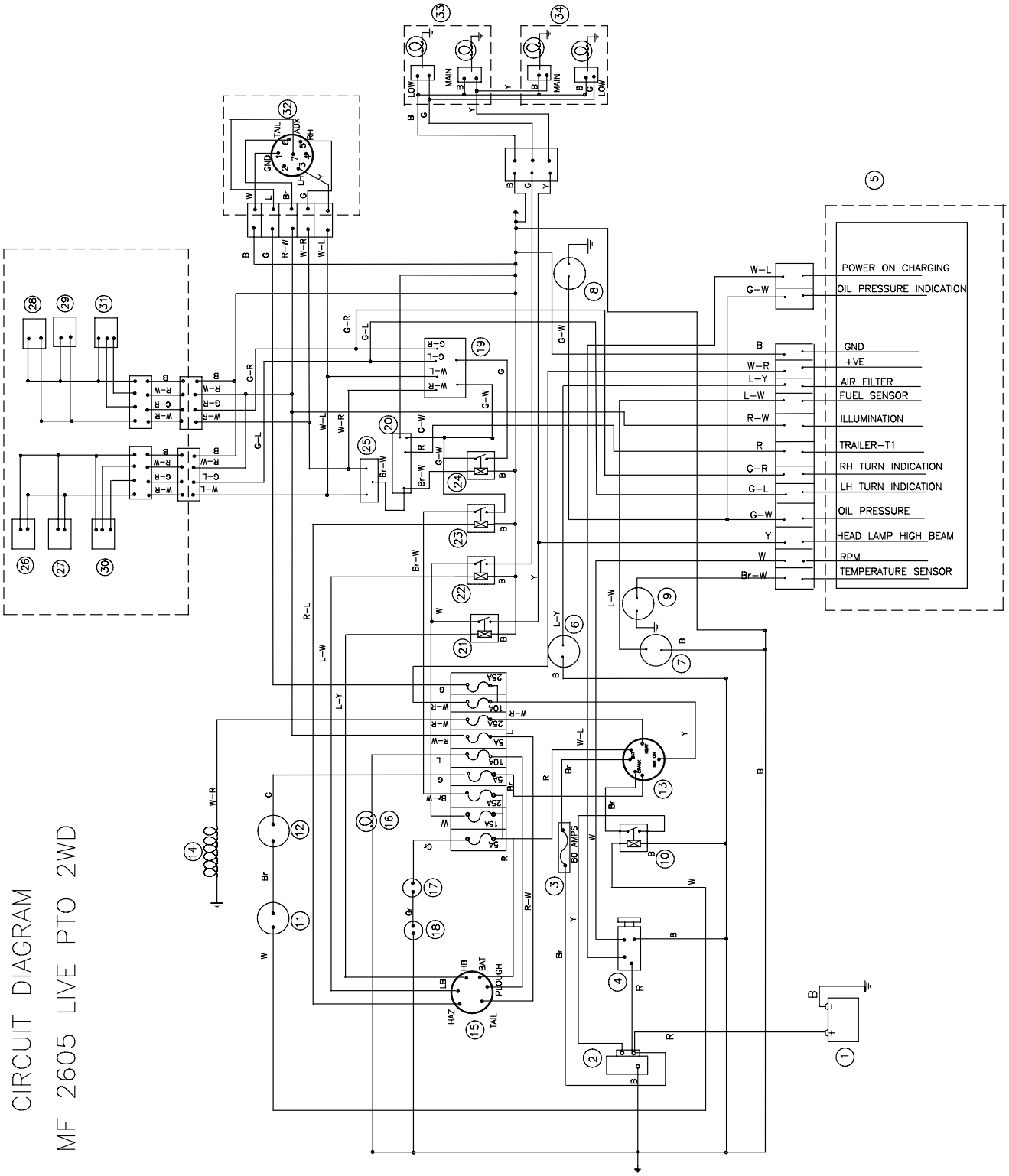
1. Remove the cluster from the tractor.
2. Remove the self tapping screws carefully , which is used in assy wiring harness in the case with clip.

Refitment:

3. Reverse the procedure 1 to 2 except
   a.tighten the screws with the torque of 1.5 kgf - cm (1.2 lbf.inch.) minimum can be applied and ensure proper seating of screws.

COLOUR CODE DETAILS

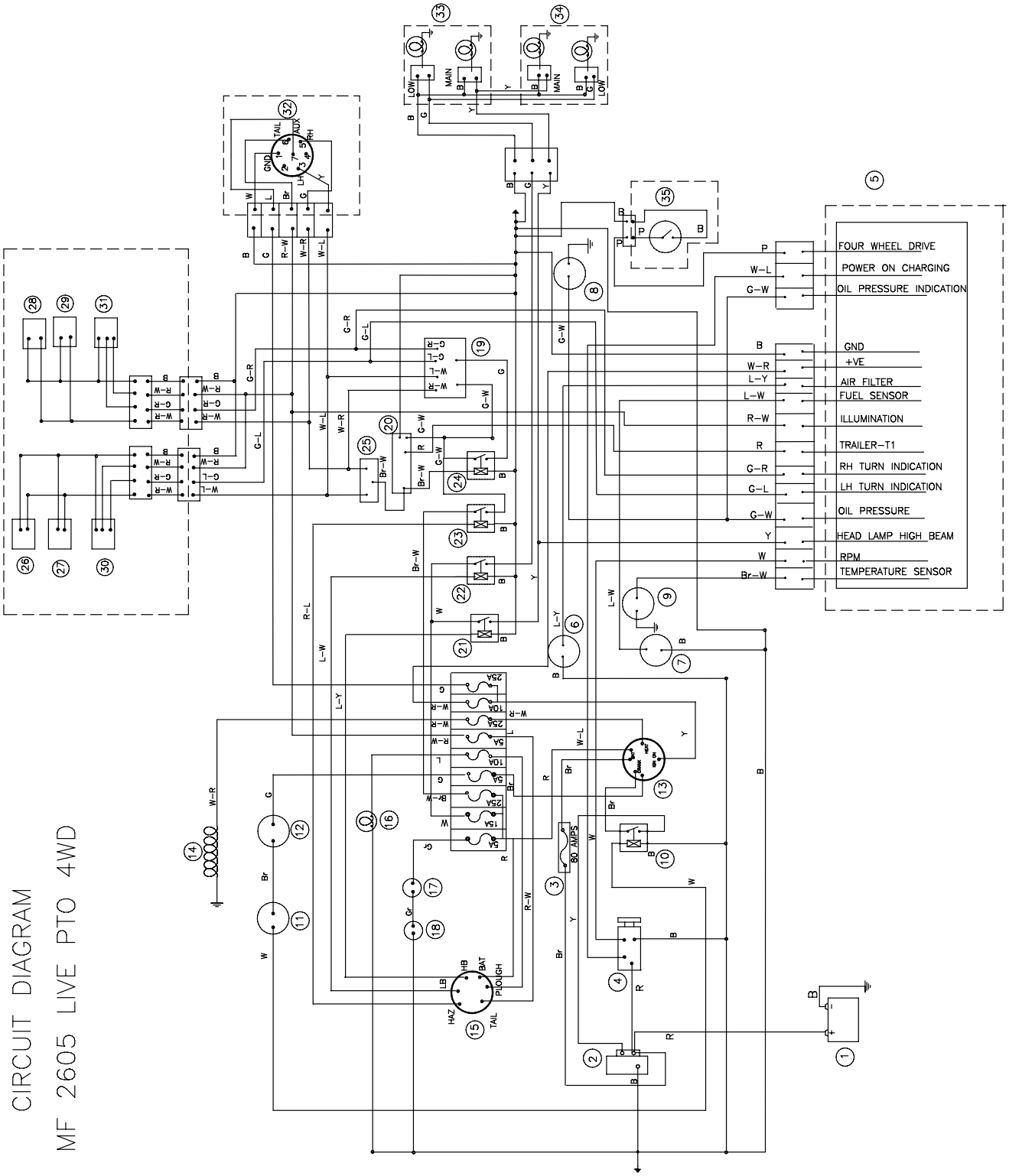
COLOUR CODE	COLOUR
B	BLACK
R	RED
Y	YELLOW
W	WHITE
G	GREEN
P	PINK
L	BLUE
Br	BROWN
Gr	GRAY
L–Y	BLUE YELLOW
R–W	RED WHITE
G–L	GREEN BLUE
W–R	WHITE RED
W–L	WHITE BLUE
L–W	BLUE WHITE
R–L	RED BLUE
G–W	GREEN WHITE
Br–W	BROWN WHITE



CIRCUIT DIAGRAM
MF 2605 LIVE PTO 2WD

COLOUR CODE DETAILS

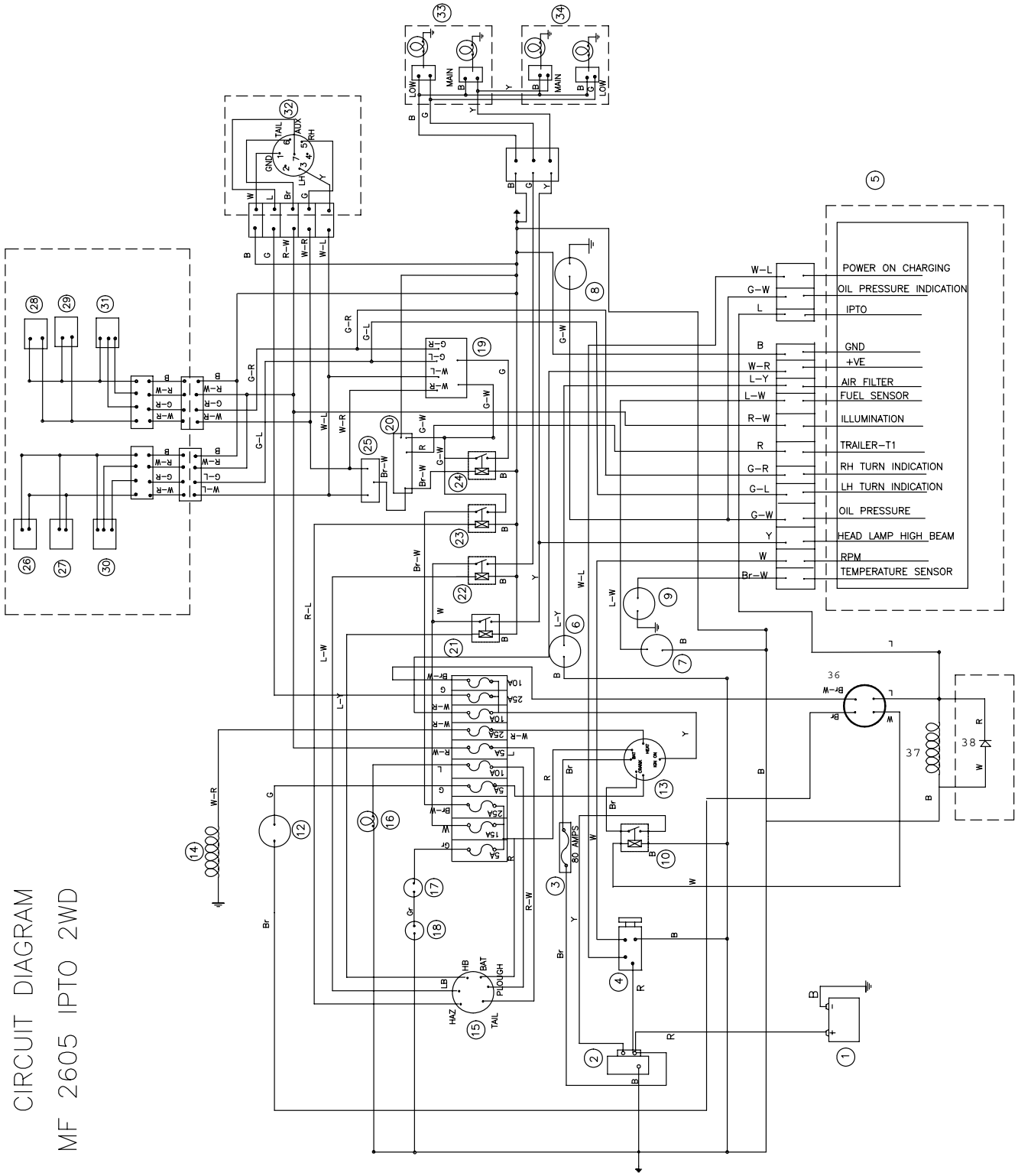
COLOUR CODE	COLOUR
B	BLACK
R	RED
Y	YELLOW
W	WHITE
G	GREEN
P	PINK
L	BLUE
Br	BROWN
Gr	GRAY
L–Y	BLUE YELLOW
R–W	RED WHITE
G–L	GREEN BLUE
W–R	WHITE RED
W–L	WHITE BLUE
L–W	BLUE WHITE
R–L	RED BLUE
G–W	GREEN WHITE
Br–W	BROWN WHITE



CIRCUIT DIAGRAM
MF 2605 LIVE PTO 4WD

COLOUR CODE DETAILS

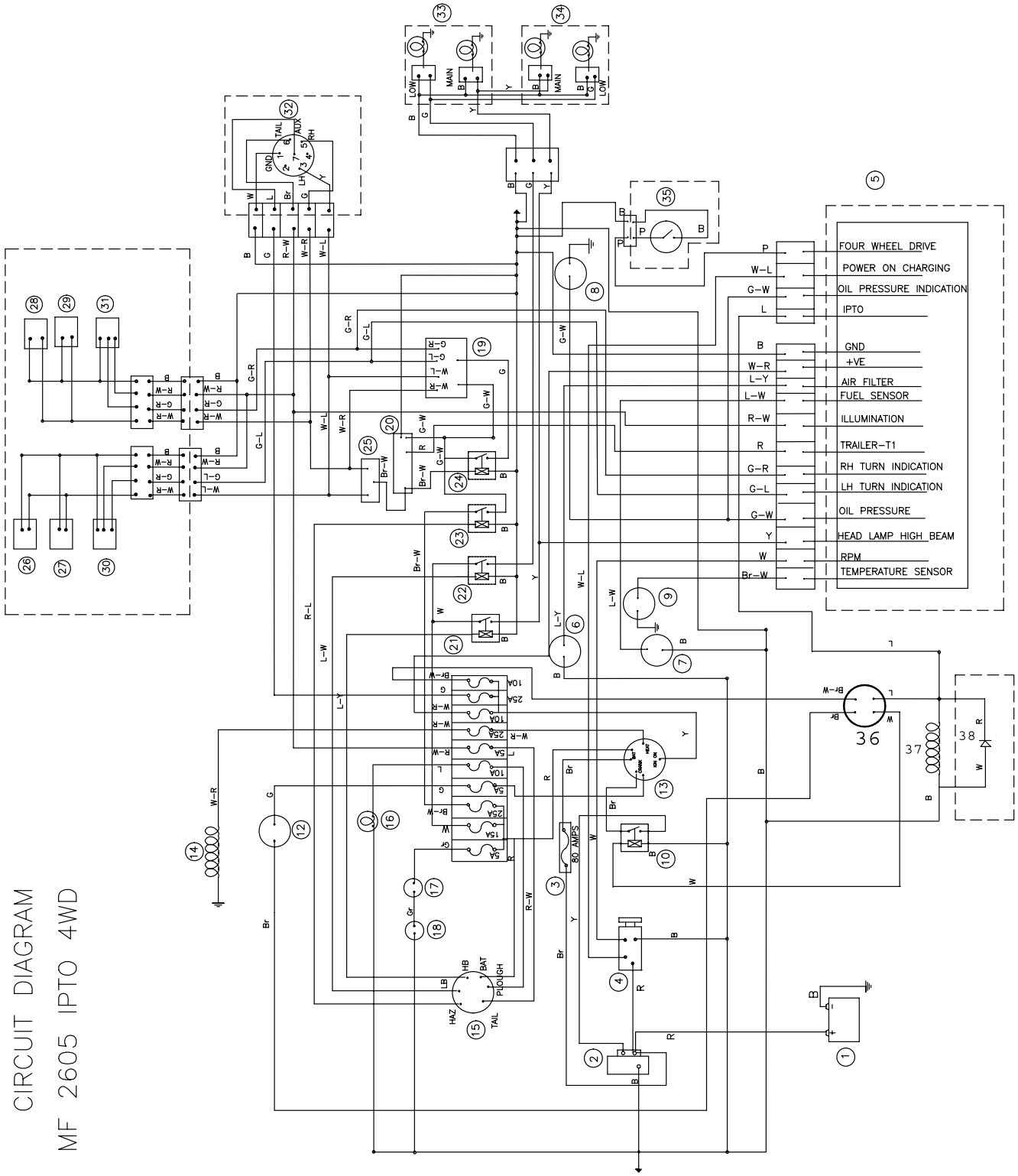
COLOUR CODE	COLOUR
B	BLACK
R	RED
Y	YELLOW
W	WHITE
G	GREEN
P	PINK
L	BLUE
Br	BROWN
Gr	GRAY
L–Y	BLUE YELLOW
R–W	RED WHITE
G–L	GREEN BLUE
W–R	WHITE RED
W–L	WHITE BLUE
L–W	BLUE WHITE
R–L	RED BLUE
G–W	GREEN WHITE
Br–W	BROWN WHITE



CIRCUIT DIAGRAM
MF 2605 IPTO 2WD

COLOUR CODE DETAILS

COLOUR CODE	COLOUR
B	BLACK
R	RED
Y	YELLOW
W	WHITE
G	GREEN
P	PINK
L	BLUE
Br	BROWN
Gr	GRAY
L–Y	BLUE YELLOW
R–W	RED WHITE
G–L	GREEN BLUE
W–R	WHITE RED
W–L	WHITE BLUE
L–W	BLUE WHITE
R–L	RED BLUE
G–W	GREEN WHITE
Br–W	BROWN WHITE



CIRCUIT DIAGRAM
MF 2605 IPTO 4WD

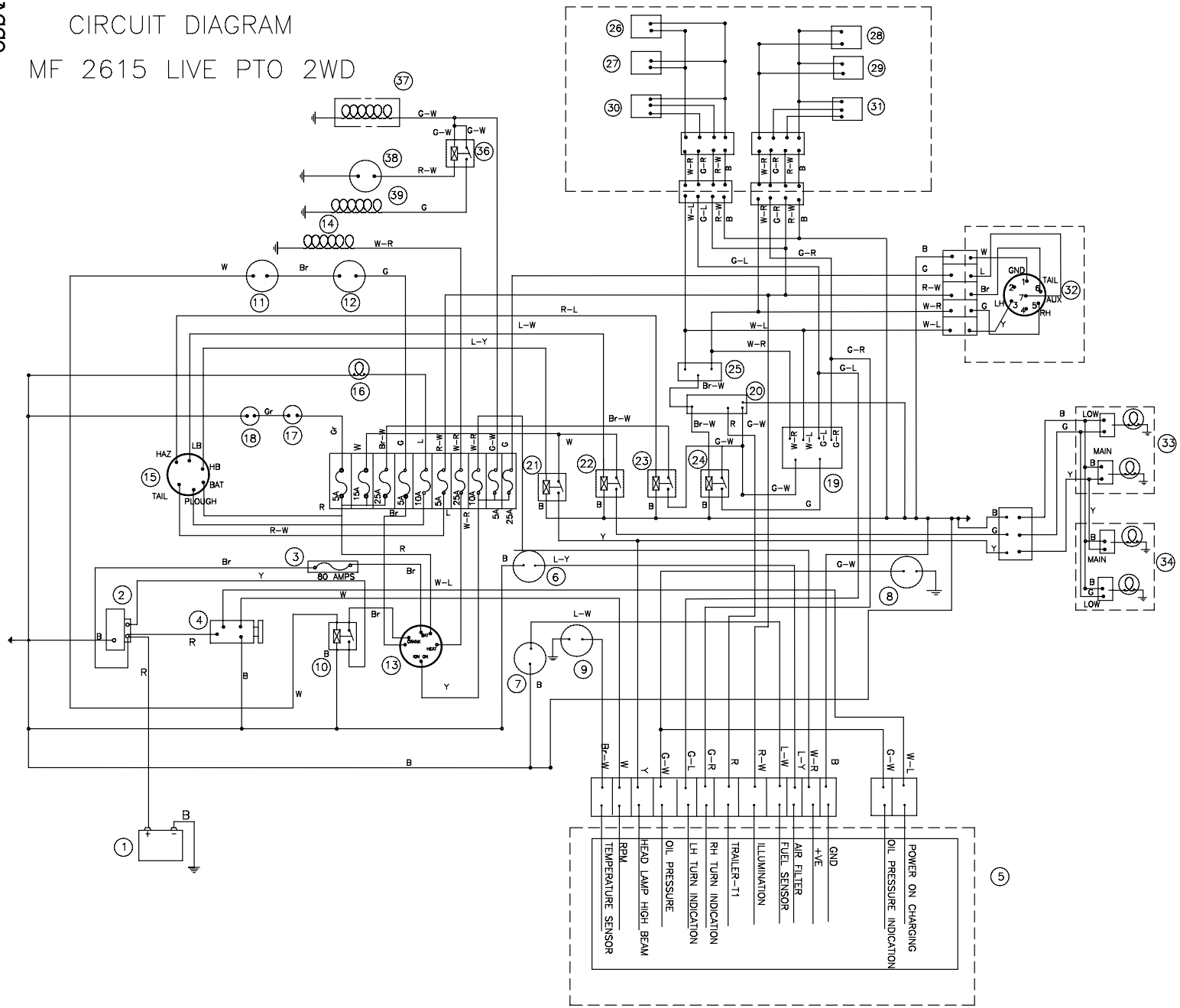
Key to wiring diagram MF 2605

1 Battery
2 Starter motor
3 Primary fuse
4 Alternator
5 Instrument cluster
6 Air restriction switch
7 Fuel sensor
8 Oil pressure switch
9 Temperature sensor
10 Starter relay
11 PTO switch
12 neutral start switch
13 Ignition switch
14 Heater
15 Light switch
16 Work lamp
17 Horn
18 Horn switch
19 Turn indicator switch
20 Flasher
21 Head lamp main beam relay
22 Head lamp dip beam relay
23 Hazard relay
24 Turn lights(red) relay
25 CA diode module
26 Amper flashing lamp-left - hand front
27 Amper flashing lamp- left -hand rear
28 Amper flashing lamp- right - hand front
29 Amper flashing lamp- right - hand rear
30 Red lamp- left - hand
31 Red lamp- right - hand
32 Trailer socket
33 Head lamp- right - hand
34 Head lamp- left - hand
35 4 Wheel drive switch
36 IPTO switch
37 IPTO solenoid
38 Diode

AGCO

CIRCUIT DIAGRAM

MF 2615 LIVE PTO 2WD

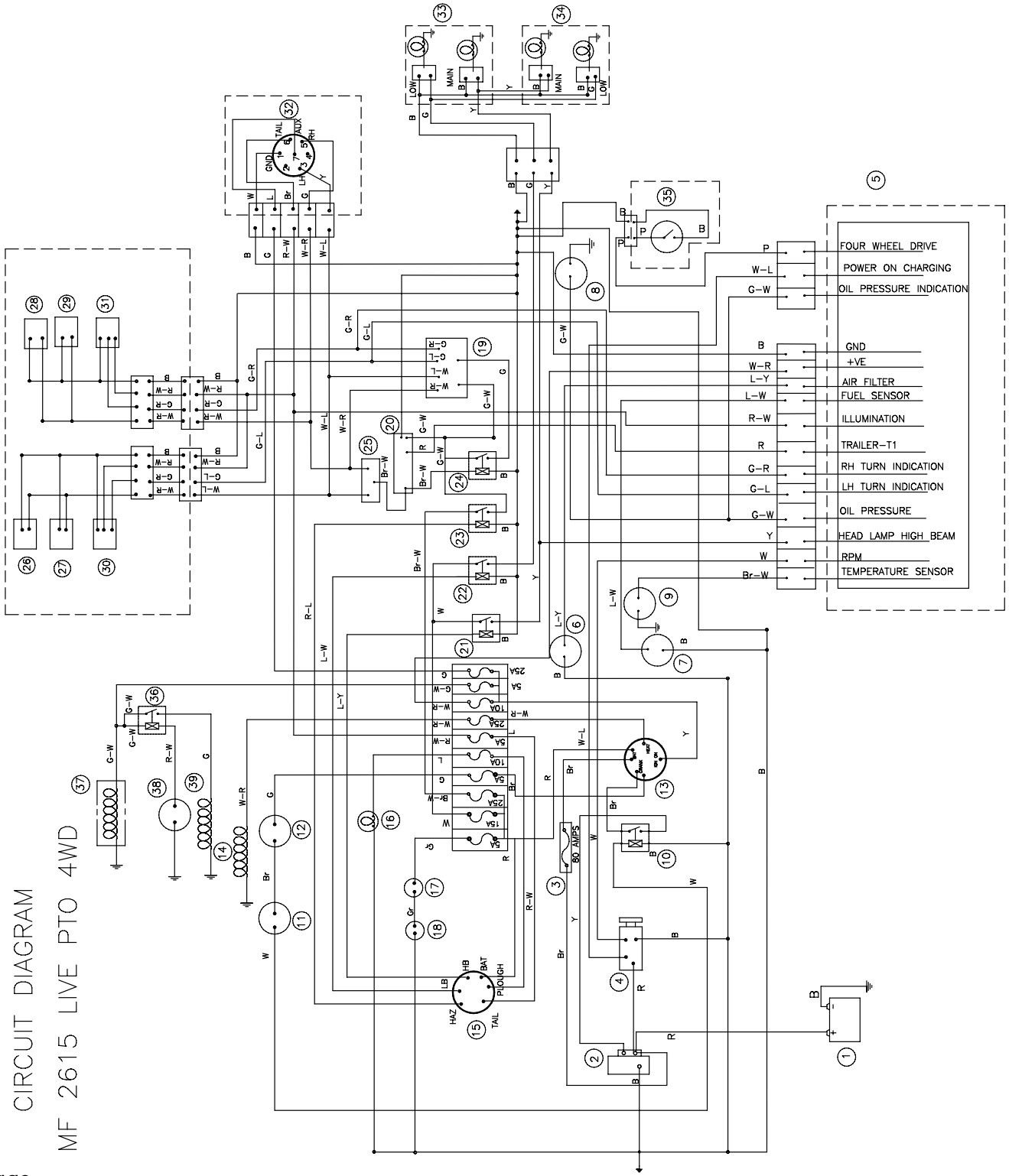


COLOUR CODE DETAILS

COLOUR CODE	COLOUR
B	BLACK
R	RED
Y	YELLOW
W	WHITE
G	GREEN
P	PINK
L	BLUE
Br	BROWN
Gr	GRAY
L–Y	BLUE YELLOW
R–W	RED WHITE
G–L	GREEN BLUE
W–R	WHITE RED
W–L	WHITE BLUE
L–W	BLUE WHITE
R–L	RED BLUE
G–W	GREEN WHITE
Br–W	BROWN WHITE

COLOUR CODE DETAILS

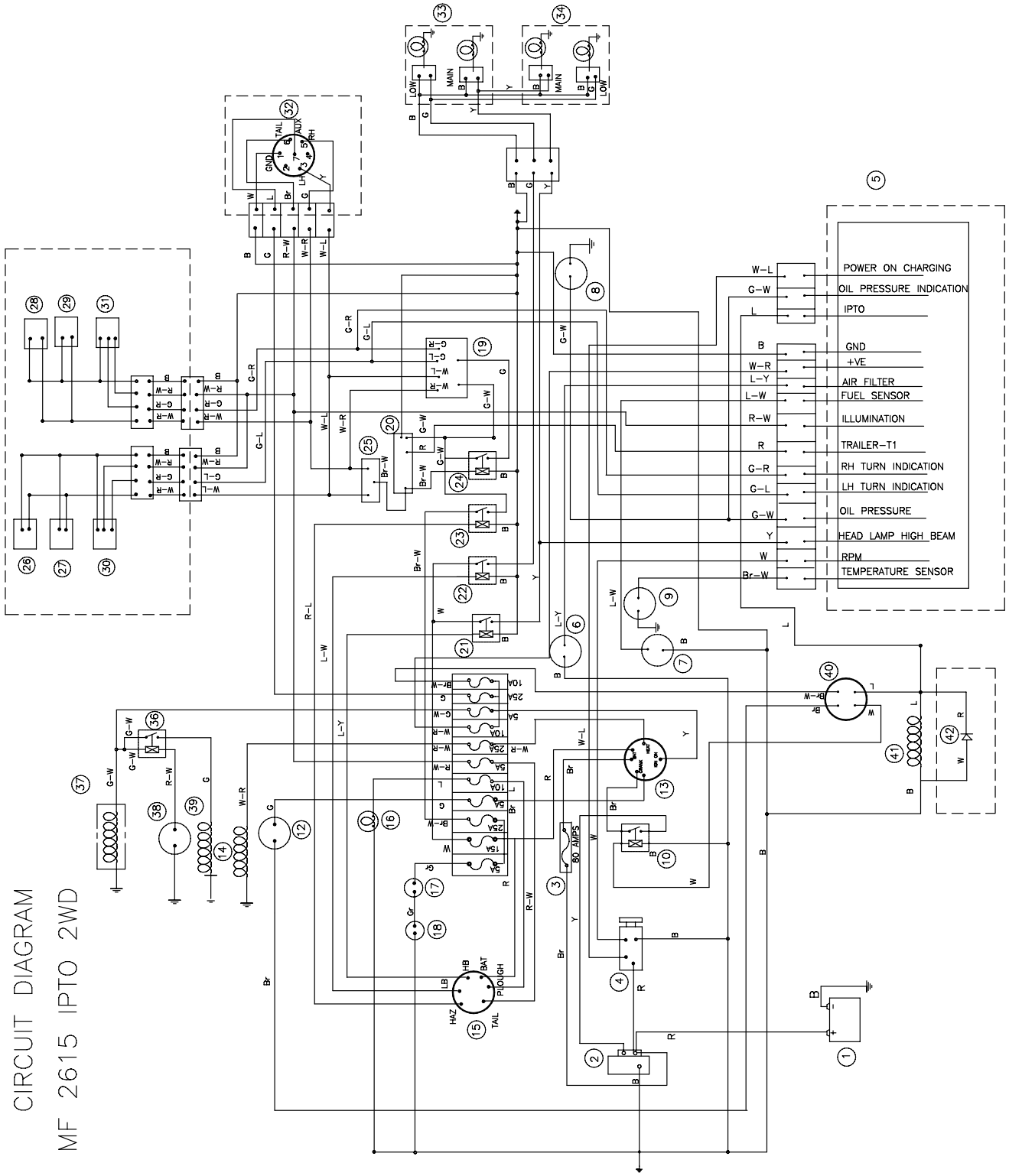
COLOUR CODE	COLOUR
B	BLACK
R	RED
Y	YELLOW
W	WHITE
G	GREEN
P	PINK
L	BLUE
Br	BROWN
Gr	GRAY
L–Y	BLUE YELLOW
R–W	RED WHITE
G–L	GREEN BLUE
W–R	WHITE RED
W–L	WHITE BLUE
L–W	BLUE WHITE
R–L	RED BLUE
G–W	GREEN WHITE
Br–W	BROWN WHITE



CIRCUIT DIAGRAM
MF 2615 LIVE PTO 4WD

COLOUR CODE DETAILS

COLOUR CODE	COLOUR
B	BLACK
R	RED
Y	YELLOW
W	WHITE
G	GREEN
P	PINK
L	BLUE
Br	BROWN
Gr	GRAY
L–Y	BLUE YELLOW
R–W	RED WHITE
G–L	GREEN BLUE
W–R	WHITE RED
W–L	WHITE BLUE
L–W	BLUE WHITE
R–L	RED BLUE
G–W	GREEN WHITE
Br–W	BROWN WHITE

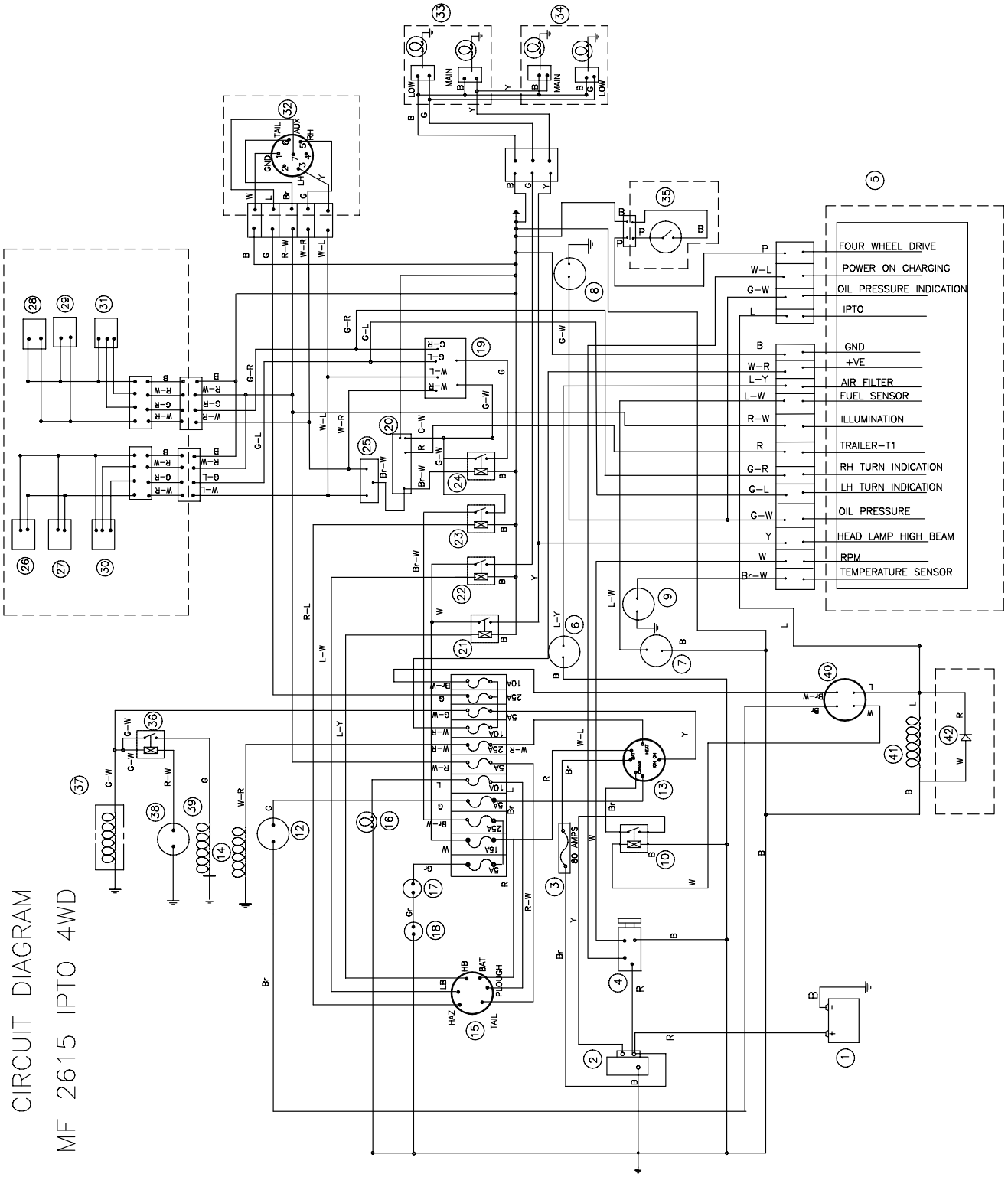


CIRCUIT DIAGRAM
MF 2615 IPTO 2WD

CIRCUIT DIAGRAM
MF 2615 IPTO 4WD

COLOUR CODE DETAILS

COLOUR CODE	COLOUR
B	BLACK
R	RED
Y	YELLOW
W	WHITE
G	GREEN
P	PINK
L	BLUE
Br	BROWN
Gr	GRAY
L–Y	BLUE YELLOW
R–W	RED WHITE
G–L	GREEN BLUE
W–R	WHITE RED
W–L	WHITE BLUE
L–W	BLUE WHITE
R–L	RED BLUE
G–W	GREEN WHITE
Br–W	BROWN WHITE



Key to wiring diagram MF 2615

1 Battery
2 Starter motor
3 Primary fuse
4 Alternator
5 Instrument cluster
6 Air restriction switch
7 Fuel sensor
8 Oil pressure switch
9 Temperature sensor
10 Starter relay
11 PTO switch
12 Neutral start switch
13 Ignition switch
14 Heater
15 Light switch
16 Work lamp
17 Horn
18 Horn switch
19 Turn indicator switch
20 Flasher
21 Head lamp main beam relay
22 Head lamp dip beam relay
23 Hazard relay
24 Turn lights(red) relay
25 CA diode module
26 Amper flashing lamp-left - hand front
27 Amper flashing lamp-left - hand rear
28 Amper flashing lamp-right - hand front
29 Amper flashing lamp-right - hand rear
30 Red lamp-left - hand
31 Red lamp-right - hand
32 Trailer socket
33 Head lamp-right - hand
34 Head lamp-left - hand
35 4 Wheel drive switch
36 KSB relay
37 Rotary pump
38 KSB switch
39 KSB solenoid
40 IPTO switch
41 IPTO solenoid
42 Diode

14 A . 30 FAULT FINDING CHART :

Symptoms	Probable chart		Test procedure	Remedial action
	Alternator	Circuit		
Indicator light stays out under all condition	---	Blown fitment	---	Renew filament
	Internal short circuit	---	Max output (low reading)	Change alternator rectifier
	---	Bad connection or broken cable	Continuity test	Renew connections / cable
Indicator light stays on under all conditions (dims at low rev/min)	High output (internal short circuit)	---	MAX. output test voltage regulator test	Change alternator rectifier / Voltage Regulator
Indicator light stays on .Dims as rev/min increases: goes out at high rev/min	---	Short circuit earth	Continuity test / Voltage drop test	Renew cable/connection
	---	Fan belt adjustment	---	Adjust fan belt
	Output low	---	Max.output test	Change alternator / Voltage Regulator
Battery not charging	---	Battery in poor condition	Hydrometer test / Discharge test	Change battery
	Voltage control faulty	---	Voltage regulator test	Change alternator / Voltage Regulator
	---	High resistance (Bad connections lead to earth)	Continuity test / Voltage drop test	Renew or clean connection
Battery over charging (excessive use of electrolyte, filament bulbs blow after short period in service	Voltage control	---	Voltage regulator test	Change alternator / Voltage Regulator
Light ON when engine stationary .Dims at cut in speed and remains dim at very high speeds.	Internal short circuit	---	Max.output (very low)	Change alternator rectifier